

PTO/SB/17

## UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S) Dae-Young Kim et al. GROUP ART UNIT: 2631  
APPLN. NO.: 09/499,014 EXAMINER: Khai Tran  
FILED: February 4, 2000  
TITLE: METHOD AND APPARATUS FOR THE CONTROL OF MODEM  
TRANSMIT POWER



Technology Center 2600

APR 15 2002

RECEIVED

Certificate of MailingDate of deposit: 3/28/02

I hereby certify that this paper is being deposited with the United States Postal Service on the date indicated above, as first-class mail, with sufficient postage attached thereto, in an envelope addressed to the Commissioner for Patents, Washington, D.C.

Elaine Cox

Signature of Person Mailing Paper

Elaine Cox

Printed Name of Person Mailing Paper

## APPELLANTS' BRIEF ON APPEAL

COMMISSIONER OF PATENTS AND TRADEMARKS WASHINGTON,  
D.C. 20231

## BOARD OF PATENT APPEALS &amp; INTERFERENCES:

This brief is filed pursuant to 37 C.F.R. §1.192 in the matter of the Appeal to the Board of Appeals and Interferences of the rejection of the claims of the above-referenced application for patent. Please charge the filing fee of \$320.00 (37 C.F.R. §1.17(f)) to Deposit Account 13-4773. This page is enclosed in triplicate for this purpose.



**RECEIVED**

APR 15 2002

Technology Center 2600

**REAL PARTY IN INTEREST**

The present application is wholly assigned to MOTOROLA, INC., a Delaware corporation with its headquarters in Schaumburg, Illinois.

**RELATED APPEALS AND INTERFERENCES**

Appellants are unaware of other appeals or interferences which will directly affect, be directly affected by, or have a bearing on the Board's decision in this appeal.

**STATUS OF CLAIMS**

Claims 1-11 are currently pending and have been rejected.

**STATUS OF AMENDMENTS**

All amendments have been entered as requested. The claims being appealed are 1, 2, 4, 7, and 10 as amended in Appellants' communication mailed September 13, 2001 and claims 3, 5, 6, 8, 9, and 11 as originally filed.

**SUMMARY OF THE INVENTION**

Referring to the Field of the Invention and the Abstract, Appellants' invention relates to a method and apparatus for adjusting modem power levels in a PCM (Pulse Code Modulated) modem system. The invention provides for controlling the transmit power of an analog modem when the transmit power level does not match the desired transmit power level. It is desired to conform to FCC regulations on transmit power and/or to eliminate non-linearities associated with higher than required power levels. It is also desired to protect against loss of signal-to-noise ratio and loss of data rate if the transmit power levels are less than that desired. In one embodiment, the power level at the analog modem is sensed, not estimated, in order to ascertain if it is not at the desired transmit power level (emphasis added). Adjustment may be provided by transmitting the desired change in the transmit power level to the digital modem, whereupon mapping parameters are redefined by adjusting the number of equivalence classes, thus to adjust transmit power at analog modem. (See Specification, page 2, lines 5-6 and page 23, lines 1-10.)

Referring to the Summary of the Invention, to check if the mapping parameters designed by a digital modem provides appropriate analog modem transmit power, in the subject system the transmit power level is measured at the analog modem. The difference between the measured transmit level and the desired transmit level is then utilized to adjust the transmit power level of the analog modem's transmitter (emphasis added).

In one embodiment, this is accomplished by having the analog modem transmit the desired change in power level to the digital modem, whereupon the digital modem redefines the equivalence classes. This is done by either increasing or decreasing the number of equivalence classes utilized. When the proper number of equivalence classes has been established from the information transmitted by the analog modem, the equivalence classes are redefined at the digital modem and the corresponding mapping parameters are transmitted back to the analog modem for setting the transmit power level to the appropriate level.

Due to changes in the mapping structure, it may be that other parameters need to be reset. For example, analog modem transmit power increases will incur higher ISI intersymbol interference and/or higher echo in the downstream direction. Therefore, in the upstream direction there might be a need for different constellations. In the downstream direction there might be a need for different constellations. However, when the power change is small, the above-mentioned effect is small, and therefore, does not need other parameter changes.

Thus changing the mapping parameters may require changing the transmit constellation, and the filter parameters, to alter the pre-equalization circuits in the analog modem. Changing the equivalence classes can in essence change the encoding and decoding scheme utilized in PCM modulation such that not only is the power level reset at the analog modem, but all pre-equalization parameters may need to be altered in accordance with the increased or decreased number of equivalence classes.

Regardless, by measuring (emphasis added) the power level at the analog modem and adjusting the number of equivalence classes a more accurate setting of the transmit power level at the analog modem is possible, as opposed to the level set by estimation of what it is or should be at the digital modem.

Moreover, the process outlined above is established during the data mode so that channel variations or impairments can be accommodated on-the-fly through readjustment of the transmit power level at the analog modem. (See Specification, page 4, line 14 to page 6, line 3.)

A discussion of one embodiment of the invention begins on page 8, last paragraph of the present application. In one embodiment of the subject invention a unit 26 is utilized to sense the power level of the transmitter of analog modem 12, with this sensed power level being compared at 28 to a desired power level (emphasis added). The difference between the sensed power level and the desired power level is quantified and is communicated at 30 as the required change to be made in order that the analog modem 12 transmitter section be adjusted to the appropriate power level.

At the receive side, an output from digital modem 18 includes detection at 32 of the power level change request generated by the analog modem. This is used at 34 to generate new mapping parameters, with the new mapping parameters transmitted at 36 back to the analog modem to reset the power level of the analog modem transmitter.

In the illustrated embodiment, the power level to which the analog modem transmitter is originally set is dependant upon the number of equivalence classes utilized. This is reflected in the mapping parameters, which as mentioned hereinbefore, is established based on an estimation which is the result of measuring the upstream channel during the startup mode.

Referring now to Figure 2, what will be seen is that the number of equivalence classes determines the average transmit power level from the analog modem. As can be seen from equation (9) hereinafter it can be shown that as the number of equivalence classes increases, power also increases.

The constellation points are distributed among the equivalence classes such that three are associated with the Equivalence Class 0, three are associated with Equivalence Class 1 and two are associated with Equivalence Class 2.

Should it be desired to increase the power level at the analog modem transmitter, as illustrated by arrow 38 the equivalence classes are redefined at the digital modem such that the number of equivalence classes in the

illustrated embodiment increases to 4. As illustrated, the equivalence classes are now 0, 1, 2 and 3.

To accommodate the same number of constellation points, the constellation points are now assigned two to Class 0, two to Class 1, two to Class 2, and two to Class 3.

Thus the same information may be transmitted by mappings to different numbers of equivalence classes, with the tradeoff being that for the larger number of equivalence classes there is a higher the power level and therefore a higher data rate. Contrarily, for a smaller number of equivalence classes the transmit power level is so low that a lower data rate results. However, if the power level is too high, non-linearities occur and the signal-to-noise ratio degrades such that downstream performance suffers. As long as non-linearities and downstream performance degradations are not severe, it is best to transmit as high as possible while conforming FCC part 68 rule to maximize the upstream data rate. In summary, the target analog transmit power level will be determined by considering and eventually trading off among nonlinearities, intersymbol interferences, downstream performance, and upstream performance.

Referring now to Figure 3, in operation, unit 54 which is coupled to an equalizer 52 in digital modem 18 detects the power level change request and generates a new set of mapping parameters which is one of the three parameters P1, P2 and P3 which are utilized by pre-compensation circuits 50 in analog modem 12 to completely specify all pre-compensation elements such as the pre-equalizer parameters, the transmit constellation and the transmit mapping parameters.

Referring to Figure 4, once the power level change request has been processed and the P1, P2 and P3 parameters have been generated at 56, then pre-equalizer 62, transmit constellation 64 and transmit mapping parameters 66 are set.

Assuming that the transmit constellation is unchanged, then by setting or changing the mapping parameters, one can unequivocally and accurately control the average power level of the transmit section of the analog modem 12.

By so doing one detects the power level at the analog modem on-the-fly, compares it to desired power levels, and communicates changes necessary to the digital modem (emphasis added). The digital modem then

adjusts the power level at the analog modem by changing the equivalence classes utilizing the communication process.

What has been described is one of the ways by which the analog modem transmit power level can be adjusted. It should be noted that the transmit power level is also determined by the transmit constellation. However, the transmit constellation itself is hard to change to obtain different upstream transmit powers, since its modification will change the error probability of the upstream receiver. Therefore, in general, only mapping parameters are modified to change upstream transmit power. (See Specification, page 8, line 21 to page 11, line 16.)

One system by which PCM modem communication is established is described in the specification starting on page 11, next to last paragraph (see Specification, page 11, line 17 to page 21, line 17.)

### ISSUES

1) Are claims 1-11 patentable over Olafsson (U.S. Pat. 6,163,570) under 35 U.S.C. 103(a)?

### GROUPING OF CLAIMS

The Appellants respectfully request that the appealed claims be considered according to the following division:

Group A--> Claims 1-3, 10-11

Group B--> Claim 4

Group C--> Claim 5

Group D--> Claim 6

Group E--> Claim 7

Group F--> Claim 8

Group G--> Claim 9

Appellants submit that each claim group stands or falls separately; however, the claim(s) within a single group stand or fall together.

## ARGUMENTS

### Arguments Common to All of the Claims

The Examiner uses Olafsson alone in the rejections of all of the claims under 35 U.S.C. 103(a). Appellants respectfully submit that the Examiner has failed to establish a prima facie case of obviousness, which is the burden of the USPTO when rejecting claims under 35 U.S.C. 103. *In re Reuter*, 651 F.2d 751, 210 USPQ 249 (CCPA 1981). The case of prima facie obviousness is not met because the references cited by the Examiner in support of the rejection do not teach or suggest all of the claim limitations recited in each of the claims. *In re Royka*, 180 USPQ 580 (CCPA 1974); *In re Wilson*, 165 USPQ 494 (CCPA 1970); *In re Fine*, 5 USPQ2d 1596 (CAFC1988).

Olafsson expressly teaches the following:

“the total average transmit power may be computed by the analog modem to ensure that the transmit power of the constellation set does not exceed the maximum transmit power level. However, without an independent verification of the transmit power associated with the signal point constellations, the digital modem may utilize a signal point constellation set that, due to computational errors on the part of the analog modem, exceeds the maximum transmit power limit.”

Olafsson, col. 2, lines 9-17 (emphasis added).

The present invention expressly teaches the following:

“Regardless, by measuring the power level at the analog modem and adjusting the number of equivalence classes a more accurate setting of the transmit power level at the analog modem is possible, as opposed to the level set by estimation of what it is or should be at the digital modem.”

Specification, page 5, last paragraph, lines 19-22 (emphasis added).

Olafsson teaches the prior art estimation described in the Specification of the present invention. It is important to note that Olafsson

expressly states in the quotation above that “computing” the total average transmit power is not good enough, which is in agreement with Appellants’ description of the prior art. Olafsson’s solution to this problem is entirely different than Appellants’ solution. Olafsson’s solution is to provide “ a transmit power verification scheme that accurately verifies the transmit power of a signal point constellation set regardless of the computational resolution of the components used in the two modem devices” (Olafsson, col. 3, lines 2-5). Appellants’ solution is to actually measure or detect the transmit power level, thus doing away with the need for Olafsson’s additional verification scheme.

Independent claim 1 of the present invention requires “detecting the transmit power level of the analog modem” and independent claim 10 requires “detecting the transmit power level of a modem”. Thus the present invention detects or measures what the power level of a modem really is, rather than merely computing an estimated power as is taught in Olafsson. Because the present invention’s claimed “detecting” of the actual power level of the modem is accurate enough, unlike the computed estimate taught in Olafsson, the present invention does not require a verification scheme as taught and required by Olafsson. Thus, the present invention, by “detecting the transmit power level of a modem” can directly guarantee conformance to FCC requirements without the need for an added verification scheme as required by Olafsson.

Appellants agree with the Examiner that Olafsson (U.S. Pat. 6,163,570) does not explicitly teach the “adjusting” steps of claim 1 and claim 10. Specifically, the “adjusting” step of claim 1 requires “adjusting the transmit power level of the analog modem in accordance with the difference between the detected transmit power level and a desired transmit power level” and the “adjusting” step of claim 10 requires “adjusting the transmit power level at the modem in accordance with the difference between the detected transmit power level at the modem and a desired transmit power level”. However, Appellants respectfully disagree with what the Examiner asserts a person of ordinary skill in the art would do. Appellants respectfully assert that a person of ordinary skill in the art would proceed just as the inventors in Olafsson did: namely the constellation set would either be discarded or modified until an acceptable constellation was obtained (i.e. a trial and error approach). See Olafsson,



col. 6, lines 24-27; col. 7, lines 55-59; col. 11, lines 30-35; and diamond 416 and box 418 in FIG. 4. The present invention does not waste the time and resources of a trial and error approach, but instead makes a direct adjustment of the transmit power level based on the difference between the detected and desired transmit power level. Olafsson does not suggest the present invention, but in fact teaches away from the present invention by teaching a trail and error approach. Again, the claimed invention can make a direct adjustment here because the actual transmit power level of the modem was detected; unlike Olafsson, which relies on a potentially less trustworthy computational estimate for the transmit power level.

Appellants respectfully note that the technique taught in Olafsson, which requires computing an estimated power of the proposed constellation in advance, is sufficient for the V.90 standard, but cannot be used for the V.92 standard. The reason being that for the V.92 standard, it is impractical to compute in advance what the transmit power will be for a proposed constellation, number of equivalence classes, and precoding coefficients because there is no known method that is accurate enough. Rather, for the V.92 standard, the encoding structure must be implemented and the resulting output power detected over a period of time. The present invention, unlike Olafsson, can be used for the V.92 standard. This is a significant advantage of the present invention over Olafsson.

Thus, Olafsson does not teach any of the steps of independent claims 1 and 10. A prima facie case of obviousness therefore has not been established. Consequently, Appellants respectfully submit that the Examiner's basis for rejecting all of the claims is in error, and reversal is respectfully requested.

#### Additional Arguments for Group B

Group B is rejected under 35 U.S.C. 103 as being obvious over Olafsson. As explained above, Olafsson does not teach or suggest the limitations of independent claim 1. Hence, the dependent claim in Group B is also non-obvious over Olafsson. Olafsson also fails to teach or suggest the limitations of the claim in Group B.

Olafsson teaches having one modem lower the transmit power limit, which is a value used in the design of a constellation. Exchange of this value obviously must occur BEFORE choice of a constellation, since it is an

input to the constellation choice/design. The present invention, on the other hand is adjusting the actual power level of the transmitter by communicating a new set of "mapping parameters", the output of the constellation design. This clearly is conveyed AFTER constellation design, and more to the point, is totally different information than the transmit power limit.

Olafsson teaches that "modem 202 may lower the transmit power limit to ensure that its computational precision does not cause an erroneous acceptance or rejection of training points or a signal point constellation set designed by modem 204" (Olafsson, col. 8, lines 41-45). So in other words, modem 202 may build in a margin for computational differences in the other modem by altering the reference limit value used in verification. Claim 4 has nothing to do with verification or computational precision (in fact nothing in the present invention has to do with computational precision of one modem relative to another). Claim 4 deals with controlling actual analog modem transmit power by altering specific features of the encoder/mapping parameter design.

#### Additional Arguments for Group C

In addition to the reasons presented above, Appellants believe the claim of Group C is not obvious over Olafsson. Claim 5 further narrows claim 4 to the case where the way the constellation is divided is changed. Olafsson teaches that a "power calculation element 242 computes the total average transmit power of the signal point constellations in accordance with the designated power formula 240 and in a similar manner as transmit power calculation element 222 (resident at modem 202)". So in other words, both modems in Olafsson use an agreed-upon, common power calculation formula. The claimed invention does not rely on a common power calculation formula; in fact, claim 5 has nothing to do with power calculation. Rather, claim 5 refers to setting the analog modem transmit power by changing the number of equivalence classes being used. The constellation is not even changed; only the grouping of points within the constellation. In this way, the power can be adjusted by sending a few bits rather than many, many bytes. In addition, it may allow the analog modem transmitter to adjust itself more easily.

### Additional Arguments for Group D

In addition to the reasons presented above, Appellants believe the claim of Group D is not obvious over Olafsson. Claim 6 further narrows claim 5. The Examiner merely cited a portion of Olafsson that teaches about generating a "transmit power limit" to be used in verification, as well as selection of a training constellation point with power at or below some other limit. The text in Olafsson cited by the Examiner says nothing about estimating or measuring the analog modem transmit power at the digital modem.

### Additional Arguments for Group E

In addition to the reasons presented above, Appellants believe the claim of Group E is not obvious over Olafsson. Claim 7 further narrows claim 6. The Examiner merely cited a portion of Olafsson that teaches about conveyance of an absolute number (the power limit). Claim 7 claims transmitting of a difference between the detected power level and the desired power level. Note that for the analog modem to send an absolute power level to the digital modem, the analog modem would have to know the digital modem's assumed power level, or the method of "computing" it (which would be inaccurate in the first place as it was only an estimate). By sending a difference as required in claim 7, the analog modem simply compares the detected (measured) actual transmit power level to its desired power, and then transmits that difference. The analog modem does not need the computation method used by the digital modem, nor does it need the assumed power level. This illustrates again the fact that Olafsson is a totally different approach which requires an estimated value to be computed.

### Additional Arguments for Group F

Group F is rejected under 35 U.S.C. 103 as being obvious over Olafsson. As explained above, Olafsson does not teach or suggest the limitations of independent claim 1. Hence, the dependent claim in Group F is also non-obvious over Olafsson. Olafsson also fails to teach or suggest the limitations of the claim in Group F.

Since Olafsson, unlike the present invention, does not detect the actual analog modem transmit power, Olafsson cannot guarantee that the

analog modem will be within FCC limits. Olafsson teaches that "modem 202 may suitably generate the transmit power limit to compensate for a computational tolerance", but even with this additional fudge factor built-in to its estimation, Olafsson never claims to guarantee that the transmit power level of the analog modem will be maintained within FCC set limits. But when you detect the actual analog modem transmit power, as is done by the present invention, it is possible to guarantee that the transmit power level of the analog modem will be maintained within FCC set limits.

#### Additional Arguments for Group G

Group G is rejected under 35 U.S.C. 103 as being obvious over Olafsson. As explained above, Olafsson does not teach or suggest the limitations of independent claim 1. Hence, the dependent claim in Group G is also non-obvious over Olafsson. Olafsson also fails to teach or suggest the limitations of the claim in Group G.

Appellants' respectfully note that the Examiner's reference to Olafsson teaching that the transmit power level is adjusted at the regulatory limit is not relevant to this claim. In fact, transmitting at the FCC limit is the highest legal power, and maximizes the undesirable noise effects over the range of legally allowed power levels, not minimizes them as argued by the Examiner. Note that the regulatory transmit power limit imposed by the FCC does not exist for the sake of minimizing noise impairments. It exists to protect telephone network equipment; just as any device would break if subjected to over-limit power, telephone network equipment can be damaged similarly and must be protected by regulation.

Accordingly, Appellants respectfully submit that the Examiner's basis for rejecting the claims of Group A through Group G over Olafsson is in error, and reversal is respectfully requested.

Respectfully submitted,



Susan C. Hill

Attorney for Appellants

Reg. No. 35,896

Ph: (512) 996-6839

## **APPENDIX**

1. In a PCM modem system including an analog modem coupled to a digital modem, a method for controlling the transmit power of the analog modem, comprising the steps of:

detecting the transmit power level of the analog modem; and,  
adjusting the transmit power level of the analog modem in accordance with the difference between the detected transmit power level and a desired transmit power level.

2. The method of Claim 1, wherein the analog modem sets the analog modem's own transmit power level.

3. The method of Claim 1, wherein the transmit power level of the analog modem is set by the digital modem.

4. The method of Claim 3, wherein the PCM modem system adjusts the power level of the analog modem by transmitting mapping parameters including equivalence classes used in the analog modem and wherein the transmit power level is proportional to the number of equivalence classes.

5. The method of Claim 4, wherein the digital modem sets the analog modem transmit power by changing the number of equivalence classes employed.

6. The method of Claim 5, wherein the digital modem estimates the transmit power of the analog modem during a startup mode.

7. The method of Claim 6, and further including the step of transmitting the difference between the detected power level and the desired power level to the digital modem for use by the digital modem in changing the number of equivalence classes employed, thus to adjust the power level of a transmitting portion of the analog modem.

8. The method of Claim 1, wherein the adjustment of the transmit power level of the analog modem is such as to maintain the transmit power level within FCC set limits.

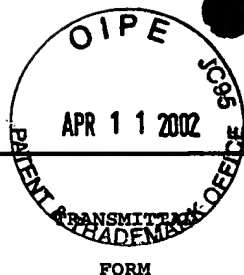
9. The method of Claim 1, wherein the adjusted transmit power level at the analog modem optimizes the PCM modem system by minimizing echo power to minimize noise components due to imperfect echo cancellation and by minimizing non-linearities and downstream performance degradation.

10. In a PCM modem system including an analog modem coupled to a digital modem, a method for controlling the transmit power of either of the modems, comprising the steps of:

- detecting the transmit power level of a modem; and,
- adjusting the transmit power level at the modem in accordance with the difference between the detected transmit power level at the modem and a desired transmit power level.

11. The method of Claim 10, wherein the transmit power level of the modem is set by the other of the modems.

PTO/S/17



DOCKET NO. CX020003

AF/2700

FORM	Application Number	09/499,014
	Filing Date	February 4, 2000
	First Named Inventor	Dae-Young Kim et al
	Group Art Unit	2631
	Examiner Name	Khai Tran
Total Number of Pages in this Submission	Attorney Docket Number	CX020003

RECEIVED

APR 15 2002

Technology Center 2600

ENCLOSURES		(check all that apply)
<input checked="" type="checkbox"/> Fee Transmittal Form	<input type="checkbox"/> Assignment Papers (for an Application)	<input type="checkbox"/> After Allowance Communication to Group
<input type="checkbox"/> Fee Attached	<input type="checkbox"/> Drawing(s)	<input checked="" type="checkbox"/> Appeal Communication to Board of Appeals and Interferences
<input type="checkbox"/> Amendment/Reply	<input type="checkbox"/> Licensing-Related papers	<input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief)
<input type="checkbox"/> After Final	<input type="checkbox"/> Petition	<input type="checkbox"/> Proprietary Information
<input type="checkbox"/> Affidavits/Declaration(s)	<input type="checkbox"/> Petition to Convert to a Provisional Application	<input type="checkbox"/> Status Letter with appropriate copies
<input type="checkbox"/> Extension of time Request	<input type="checkbox"/> Power of Attorney, Revocation, Change of Correspondence Address	<input type="checkbox"/> Other Enclosure(s) (please identify below)
<input type="checkbox"/> Express Abandonment Request	<input type="checkbox"/> Terminal Disclaimer	<input type="checkbox"/> Response to Restriction Requirement
<input type="checkbox"/> Information Disclosure Statement	<input type="checkbox"/> Request for Refund	<input type="checkbox"/> Associate Power of Attorney
<input type="checkbox"/> Certified Copy of Priority Documents	<input type="checkbox"/> CD, Number of CDs	<input type="checkbox"/> RCE
<input type="checkbox"/> Response to Missing Parts/Incomplete Application	Remarks	
<input type="checkbox"/> Response to Missing Parts Under 37 CFR 1.52 or 1.53		

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual	Susan C. Hill	Registration No.	35,896
Signature	<i>Susan C. Hill</i>		
Date	3/28/02		

## CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage thereon, as first-class mail, in an envelope addressed to: Commissioner for Patents, Washington, DC 20231 on the date listed below:

Typed or printed name	Elaine Cox		
Signature	<i>Elaine Cox</i>	Date	3/28/02



PTO/SB/17

<b>FEE</b> <b>TRANSMITTAL</b> Patent fees are subject to annual revision		Complete if Known	
		Application Number	09/499,014
		Filing Date	February 4, 2000
		First Named Inventor	Dae-Young Kim et al.
		Examiner Name	Khai Tran
TOTAL AMOUNT OF PAYMENT (\$ ) 320		Group Art Unit	2631
		Attorney Docket No.	CX020003

## METHOD OF PAYMENT

## FEE CALCULATION (continued)

1. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any overpayment to:
- Deposit Account Number 13-4773
- Deposit Account Name Motorola, Inc.
- ☒ Charge Any Additional Fee required under 37 CFR 1.16 and 1.17
- ☐ Applicant claims small entity status. See 37 CFR 1.27

2. ☐ Payment Enclosed:
- ☐ Check ☐ Credit Card ☐ Money Order ☐ Other

## FEE CALCULATION

## 1. BASIC FILING FEE

Large Fee	Entit Y Fee	Small Fee	Entit Y Fee	Fee Paid
Code	(\$)	Code	(\$)	
101	740	201	370	Utility filing fee
106	330	206	165	Design filing fee
107	510	207	255	Plant filing fee
108	740	208	370	Reissue filing fee
114	160	214	80	Provisional filing fee

SUBTOTAL (1) (\$ )

## 2. EXTRA CLAIM FEES

	Previously Paid**	Extra Claims	Fee from below	Fee Paid
Total Claims				
Independent Claims				
Multiple Dependent				

Large Fee	Entit Y Fee	Small Fee	Entit Y Fee	Fee Description
Code	(\$)	Code	(\$)	
103	18	203	9	Claims in excess of 20
102	84	202	42	Independent claims in excess of 3
104	280	204	140	Multiple dependent claim, if not paid
109	84	209	42	* Reissue independent claims over original patent
110	18	210	9	*Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$ )

\*\*OR NUMBER PREVIOUSLY PAID, IF GREATER THAN STANDARD ALLOWANCE.

\*For Reissues, see above

## 3. ADDITIONAL FEES

Large Entity	Small Entity	Fee	Fee	Fee Description
Code	(\$)	Code	(\$)	
105	130	205	65	Surcharge - late filing fee or oath
127	50	227	25	Surcharge - late Provisional filing
139	130	139	130	Non-English specification
147	2520	147	2520	For filing a request for ex parte Reexamination
112	920*	112	920*	Requesting publication of SIR prior to Examiner action
113	1840*	113	1840*	Requesting publication of SIR after Examiner action
115	110	215	55	Extension for reply within first month
116	400	216	200	Extension for reply within second month
117	920	217	460	Extension for reply within third month
118	1440	218	720	Extension for reply within fourth month
128	1960	228	980	Extension for reply within fifth month
119	320	219	160	Notice of Appeal
120	320	220	160	Filing a brief in support of an appeal
121	280	221	140	Request for oral hearing
138	1510	138	1510	Petition to institute a public use proceeding
140	110	240	55	Petition to revive - unavoidable
141	1280	241	640	Petition to revive - unintentional
142	1280	242	640	Utility issue fee (or reissue)
143	460	243	230	Design issue fee
144	620	244	310	Plant issue fee
122	130	122	130	Petitions to the Commissioner
123	50	123	50	Processing fee under 37 CFR 1.17(q)
126	180	126	180	Submission of IDS
581	40	581	40	Recording each patent assignment per property (times number of properties)
146	740	246	370	Filing a submission after final rejection (37 CFR § 1.129(a))
149	740	249	370	For each additional invention to be examined (37 CFR § 1.129(b))
179	740	279	370	Request for Continued Examination (RCE)
169	900	169	900	Request for expedited examination of a design application

Other fee (specify)

\* Reduced by Basic Filing Fee paid SUBTOTAL (3) (\$ ) 320

## SUBMITTED BY

Name (Print/Type) Susan C. Hill

Signature

Susan C. Hill

Reg. No.

35,896

Telephone

(512) 996-6839

Date

3/28/02